CLAIMS

What is claimed is:

1. An induction device having a core and a distributed air gap, comprising:

an air gap insert for providing reluctance in said air gap;

said air gap insert is a dielectric container; and

said induction device has a transition zone comprising a plurality of magnetic permeability values.

2. The induction device of claim 1, wherein:

said core has opposed free ends forming an interface with said air gap insert;

said air gap insert has a magnetic permeability value;

said opposing free ends of said core have a magnetic permeability value;

said core has a magnetic permeability value;

said permeability value of said air gap insert is less than said magnetic permeability value of said opposing free ends; and

said permeability value of said opposing free ends is less than said magnetic permeability value of said core,

whereby said difference in magnetic permeability values forms said transition zone.

3. The induction device of claim 2, wherein:

said air gap insert is a dielectric container filled with magnetic particles.

4. The induction device of claim 3, wherein:

said magnetic particles are magnetic powder particles in a dielectric matrix.

5. The induction device of claim 4, wherein:

said magnetic particles are coated.

6. The induction device of claim 3, wherein:

said container is flexible; and

a force applied to said air gap insert changes the density of said magnetic particles and thereby changes the reluctance in said air gap.

7. The induction device of claim 6, wherein:

said density of said magnetic particles is selectively adjustable by a factor of 2 - 4 times the magnetic permeability in response to said force being applied to said air gap insert.

8. The induction device of claim 7, wherein:

said core is comprised of at least one of:

a) a magnetic wire,

b) a ribbon of magnetic material, and

c) a magnetic powder metallurgy material.

9. The induction device of claim 3, wherein:

said interface is planar.

10. The induction device of claim 3, wherein:

said interface is curved.

11. The induction device of claim 3, wherein:

said interface is jagged.

12. An induction device having a core and a distributed air gap, comprising:

an air gap insert for providing reluctance in said air gap;

said air gap insert is a multi-component structure; and

said induction device has a zone of transition with more than one value of magnetic permeability.

13. The induction device of claim 12, wherein:

said multi-component structure has a central portion and end portions.

14. The induction device of claim 13, wherein:

said central portion has a permeability value;

said end portions have a permeability value;

said core has a permeability value;

said permeability value of said central portion is less than the permeability value of said end portions; and

said permeability value of said end portions is less than said permeability value of said core,

whereby said difference of permeability values forms said transition zone.

15. The induction device of claim 14, wherein:

said central portion is filled with magnetic particles in a matrix of dielectric material; and

said end portions are filled with chopped magnetic wire.

16. The induction device of claim 14, wherein:

said central portion is filled with magnetic particles in a matrix of dielectric material; and

said end portions are filled with chopped magnetic wire in a matrix of dielectric material.

17. The induction device of claim 14, wherein:

said core is comprised of at least one of:

a) a magnetic wire,

b) a ribbon of magnetic material, and

c) a magnetic powder metallurgy material.

18. An induction device having a core and a distributed air gap, comprising:

an air gap insert for providing reluctance in said air gap;

said core has a plurality of wires, a portion of said plurality of wires is inserted into said air gap insert; and

said induction device has a zone of transition with more than one value of magnetic permeability.

19. The induction device of claim 18, wherein:

said air gap insert has a permeability value;

said portion of said plurality of wires has a permeability value;

said core has a permeability value;

said permeability value of said air gap insert is less than said permeability value of said portion of said plurality of wires; and

said permeability value of said portion of said plurality of wires is less than said permeability value of said core,

whereby said difference in permeability values forms said transition zone.